

**REMARKS**

Claims 1-3 and 7-9 are pending in this application on the merits. Claims 1, 2, 7 and 9 have been amended to more clearly recite the claimed embodiments. Claims 4-6 have been canceled without prejudice or disclaimer. Claim 8 was previously withdrawn from further consideration. Support for the amendment of the claims can be found in the specification as filed. Specifically, claim 1 has been amended to incorporate the features of claims 4 and 5 and include the limitation of the wavelength and dose of the ultraviolet irradiation. Claim 2 has been amended to incorporate the features of claims 4-6 and include the limitation of the wavelength and dose of the ultraviolet irradiation. Claim 7 has been amended to properly depend from claim 2. Claim 9 has been amended to include the limitation of the wavelength and dose of the ultraviolet irradiation. Support for the amendments of claims 1, 2 and 9 can be found at page 5, line 14, and page 10, Example 1. Applicants reserve the right to file one or more divisional or continuation applications to any withdrawn or cancelled subject matter that appeared in the application as originally filed. No new matter has been added.

**I. The Rejection of Claims Under 35 U.S.C. § 102(b) Should be Withdrawn**

Claims 1 and 3 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Hanus et al. (Applied Surface Science, pp 154-155 (2000)) ("Hanus") for the reasons cited on page 2 of the Office Action. According to the Office Action, Hanus allegedly teaches a process for producing a poly(methyl methacrylate) metal cluster composite which comprises bringing PMMA into contact with a heavy metal compound under ultraviolet irradiation. Applicants respectfully submit that they have amended claims 1 and 3 in part to limit the wavelength and dose of the ultraviolet irradiation to 250-350 nm and 0.1-2 J/cm<sup>2</sup> respectively. Since Hanus disclosed the wavelength of the excimer laser as 248 nm (see page 321, left column, second para. lines 14), Hanus does not disclose the ultraviolet irradiation wavelength range of 250-350 nm recited in the amended claims 1 and 3. Moreover, Hanus does not disclose that the poly(methyl methacrylate) is brought into contact with the heavy metal compound in a non-oxidizing atmosphere at a temperature equal to or higher than the glass transition temperature of the

poly(methyl methacrylate). Hanus is silent as to the temperature at which the poly(methyl methacrylate) and the heavy metal compound are contacted. For at least the reasons discussed above, Hanus does not disclose each and every limitation of the claimed invention. Accordingly, Applicants respectfully submit that the rejection of claims 1 and 3 under 35 U.S.C. § 102 (b) should be withdrawn.

## **II. The Rejection of Claims Under 35 U.S.C. § 103(a) Should be Withdrawn**

Claims 1-6 are rejected under 35 U.S.C. § 103 (a) as allegedly being obvious over Nakao (Chemistry Letters, pp 766–767 (2000)) (“Nakao”) in view of Beauvois (Nuclear Instruments and Methods in Physics Research Section B, 131(1), pp 167-171 (1997)) (“Beauvois”) and Hanus. According to the Office Action, it is allegedly obvious for a skilled artisan to decompose the metal acetylacetone complex in the process of Nakao by ultraviolet radiation as suggested by Beauvois as an alternative to decomposing the complex because both methods would be expected to successfully form a PMMA-metal cluster composite as evidenced by Hanus. Claims 7 and 9 are rejected under 35 U.S.C. § 103 (a) as allegedly obvious over Nakao in view of Beauvois and Hanus, and further in view of Zhang (Journal of Materials Science Letters, 16, pp 996-998 (1997)) (“Zhang”). According to the Office Action, it is obvious to use a mask suggested by Zhang in the process of Beauvois and Hanus to form metal clusters in a desired pattern.

Applicants respectfully submit that, for the following reasons, the above described references are not combinable to give one of ordinary skill in the art a reasonable expectation of success in producing the claimed invention. Nakao discloses that heating PMMA sheet with Pd-AA vapor provides only a small amount of Pd cluster after 16 h at 180 °C (see Nakao, last para. on the left column, first para. on the right column at page 766). According to Nakao, post-heating treatment is required to convert the Pd-AA dissolved in PMMA to Pd clusters. Nakao does not teach or suggest the use of ultraviolet radiation. Beauvois teaches decomposition of PMMA-copper acetylacetone composite films by pyrolysis or photolysis. According to Beauvois, the PMMA-copper acetylacetone composite films must be formed before irradiation

by dissolving PMMA and AcAcCu in  $\text{CHCl}_3$  (*see* Beauvois, left column at page 168). Hanus teaches the irradiation of CuAcAc embedded in PMMA. Both Beauvois and Hanus require the formation of the CuAcAc-PMMA cluster or film before the irradiation, whereas the claimed invention is directed to a substrate unassociated or unembedded with the heavy metal compound prior to irradiation (see Examples 1 and 2 at page 10). Accordingly, Beauvois and Hanus do not fill in the deficiencies in Nakao and, indeed, teach away from the claimed invention.

Furthermore, there would no reasonable expectation of success in combining the teachings of Nakao with Beauvois and Hanus because the formation of the precursor PMMA-CuAcAc complex is critical in the cited references to form the cluster composite. For similar reasons, there would no reasonable expectation of success in combining the teachings of Nakao in view of Beauvois and Hanus and Zhang to reach claims 7 and 9. Therefore, Applicants respectfully submit that the rejections of independent claims 1, 2, and 9 as well as the corresponding dependent claims under 35 U.S.C. § 103 (a) should be reconsidered and withdrawn.

**CONCLUSIONS**

It is respectfully submitted that all claims are now in condition for allowance, early notice of which would be appreciated. Should the Examiner disagree, Applicants respectfully request a telephonic or in-person interview with the undersigned attorney to discuss any remaining issues and to expedite the eventual allowance of the claims.

Except for issues payable under 37 C.F.R. 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 50-0310.

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Respectfully submitted,  
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